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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,808	01/27/2004	Huang-Ming Chen	N1085-00256	2454
54657	7590	07/21/2006	[TSMC2003-08]	
DUANE MORRIS LLP IP DEPARTMENT (TSMC) 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103-4196			EXAMINER MOORE, KARLA A	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 07/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/765,808

Applicant(s)

CHEN ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 29-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 29-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim 32 (the first one) been renumbered 31.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent No. 2002009042 A to Kimura.

4. With respect to claim 8, Kimura also disclose a plasma etching apparatus in Figure 1a, comprising: a chuck (multi-part structure, 2 and 20) for retaining a substrate (3) and a focus ring (4), at least one of said chuck and said focus ring formed of a material that includes oxygen therein such that oxygen is released when an etching operation is carried out.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-6 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent No. 2002009042 A to Kimura in view of Japans Patent No. 2000208492 A to Yamashita.

9. Kimura discloses a plasma etching apparatus in Figure 1a substantially as claimed and comprising: a chuck (multi-part structure, 2 and 20) for retaining a substrate (3); and hardware (4) that includes oxygen therein such that oxygen is released when an etching operation is carried out. See abstract.

10. However, while Kimura does teach that the focal ring can be made to contain a predetermined amount of oxygen by approaches other than coating (see JPO online translation, paragraph 50), Kimura does not explicitly teach that the oxygen is impregnated in the material of the focus ring.

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11. Yamashita discloses the use of a focus ring formed of a material than includes oxygen impregnated therein (i.e. existing in quartz) for the purpose of preventing the in-plane uniformity of a semiconductor wafer from being damaged (abstract).

12. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a focus ring formed of a material that includes oxygen impregnated (existing therein) in Kimura in order to prevent the in-plane uniformity of a semiconductor wafer from being damaged as taught by Yamashita.

13. With respect to claim 2, said chuck is substantially circular (it is designed to correspond with the periphery of the chuck and wafer, which are both circular; see Figures 1b and 2b) and said hardware comprises a focus ring that peripherally surrounds said chuck (see Figure 1a).

14. With respect to claim 3, said chuck is substantially circular and said hardware comprises a focus ring (abstract) that is annular in shape and at least a portion of said focus ring substantially continuously extends below a peripheral portion of said chuck (see Figures 1a and 1b).

15. With respect to claim 4, said chuck comprises an electrostatic chuck (see paragraph 25 of JPO online translation).

16. With respect to claims 5 and 6, said hardware comprises a focus ring formed of ceramic (e.g. quartz). The exact composition can be determined based on an intended method that will take place in the apparatus. See JPO online translation, paragraphs 6 and 50).

17. The limitations of claim 29 are similar to those of claim 1 and are addressed above.

18. With respect to claims 30 and 32, it would have been obvious to one of ordinary skill in the art to form a chuck (or any other part of the etching apparatus that may be exposed during processing) of an oxygenated material for the same purpose that the focus ring is taught to be formed of an oxygen-impregnated material. So that upon exposure, oxygen is discharged and the uniformity of an etch rate can be improved.

19. With respect to claim 31, said chuck of Kimura comprises an electrostatic chuck (see paragraph 25 of JPO online translation).

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20. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura and Yamashita as applied to claims 1-6 and 29-32 above, and further in view of U.S. Patent No. 5,556,500 to Hasegawa et al.

21. Kimura and Yamashita disclose the invention substantially as claimed and as described above.

22. However, Kimura and Yamashita fails to teach an additional focus ring, that is a focus ring set.

23. Hasegawa et al. teach the use of a focus ring set for the purpose of providing each of the parts made out of different construction materials so that the in-plane uniformity of etching characteristics such as an etching rate, etching anisotropy, etc. can be optimized and enhanced (column 6, row 29 through column 7, row 8).

24. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a focus ring set in Kimura and Yamashita in order to provide each of the parts made out of a different construction materials so that the in-plane uniformity of etching characteristics such as an etching rate, etching anisotropy, etc. could be optimized and enhanced as taught by Hasegawa et al.

25. Claims 9 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura and Yamashita as applied to claims 1-6 and 29-32 above, and further in view of Japanese Patent No. 2002016126 to Nagaiwa et al.

26. Kimura and Yamashita disclose the invention substantially as claimed and as described above.

27. However, Kimura and Yamashita fail to teach said focus ring is maintainable at a temperature not greater than a temperature of said substrate while and etching operation is carrier out upon said substrate.

28. Nagaiwa et al. disclose a plasma etching apparatus in Figures 1 and 2 comprising: a focus ring (12); and a chuck (11) for retaining a substrate, said focus ring capable of being maintained at a temperature no greater than a temperature of said substrate while and etching operation is carried out for

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the purpose of preventing deteriorated etching characteristics due to the influence of temperature. Also see abstract and paragraphs 24 and 25 of JPO online translation.

29. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided said focus ring capable of being maintained at a temperature no greater than a temperature of said substrate while an etching operation is carried out in order to prevent deteriorated etching characteristics due to the influence of temperature as taught by Nagaiwa et al.

30. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura, Yamashita and Nagaiwa et al. as applied to claims 9 and 33 above in view of Japanese Patent No. 2002009042 A to Kimura.

31. Kimura, Yamashita and Nagaiwa et al. disclose the invention substantially as claimed and as described above. Additionally, with respect to claim 10, Nagaiwa et al. disclose that the substrate may be a semiconductor substrate (paragraph 2 of JPO online translation). With regards to claim 11, it is also taught that said focus ring maintains contact with the said electrostatic chuck and said chuck is cooled during said etching operation, as described above and illustrated in Figures 1 and 2. Further with respect to claim 12, said focus ring is disposed peripherally around said substrate and includes a portion that rests on an annular landing section of the chuck (see Figures 1 and 2). The focus ring rests on an annular landing section (11b) of the electrostatic chuck.

32. However, Kimura, Yamashita and Nagaiwa et al. fail to explicitly teach that the chuck is an electrostatic chuck.

33. Kimura teaches using an electrostatic chuck for the purpose of providing adsorptive support to a wafer being processed (paragraph 25).

34. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an electrostatic chuck in Kimura, Yamashita and Nagaiwa et al. in order to provide adsorptive support to a wafer being processed as taught by Kimura.

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35. With respect to claim 13, Nagaiwa et al. disclose the invention substantially as claimed and as described above.

36. However, Nagaiwa et al. fail to teach said focus ring includes oxygen therein and is capable of releasing oxygen during an etching process.

37. Kimura teaches the use of a focus ring capable of releasing oxygen for the purpose of improving the uniformity in an etch rate (abstract).

38. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a focus ring capable of releasing oxygen in Nagaiwa et al. in order to improve the uniformity in an etch rate as taught by Kimura.

Response to Arguments

39. Applicant's arguments with respect to claims 1-7, 9-12 and 29-33 have been considered but are moot in view of the new ground(s) of rejection. New art is relied upon that teaches providing oxygen impregnated/throughout the focus ring material.

40. With respect to claim 8, there do not appear to be any arguments in Applicant's response to the previous office action drawn to this claim that hold Kimura fails to teach "said focus ring formed of a material that includes oxygen therein". Nevertheless, Examiner points out that Kimura anticipates this limitation because the coating of the focus ring is part of the focus ring.

Conclusion

41. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action

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is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karla Moore
Primary Examiner
Art Unit 1763
18 July 2006